

USSN 10/780,428

2

RECEIVED  
CENTRAL FAX CENTER  
JAN 24 2008

Amendments to the Claims

Please cancel claims 2, 3, and 6; amend claims 1 and 7-11; withdraw claim 4; and add new claim 12; all without prejudice or disclaimer, as indicated in the following Listing of Claims.

*Listing of Claims*

1. **(Currently amended)** A pump for pumping fluid comprising two or more pairs of plungers,
- each pair of plungers comprising a first plunger and a second plunger, each plunger being reciprocable within a respective plunger bore defined by a housing, the respective plunger bores being in communication with one another by way of a connecting passage,
- wherein each pair of first and second plungers, together with their respective plunger bores, defines, at least in part, a pumping volume,
- each pair of plungers performing, in use, a pumping cycle, and each pair of plungers having a respective inlet port and outlet port,
- wherein an end of each said first plunger is arranged to cover its respective inlet port during a pump delivery stage in which fluid is displaced from the pumping volume,
- wherein an end of each said second plunger is arranged to cover its respective outlet port during a pump fill stage in which fluid is drawn into the pumping volume,
- wherein the end of each said first plunger and the end of each said second plunger are arranged to cover the inlet port and outlet port respectively during a pump transfer stage during which the pumping volume is maintained,
- wherein each pair of first and second plungers are aligned along a respective common bore axis, each of said respective bore axis axes being oriented along a common bore axis plane, and each said pair of first and second plungers mounted in opposed in-line formation within said housing,
- wherein each of said two or more pairs of plungers are coupled to a shoe that embraces a respective roller that is in contact with, and is thus driven by, means of a single cam ring that is configured to rotate about an axis of rotation oriented substantially transverse to said common bore axis plane.

USSN 10/780,428

3

2. (Cancelled) A pump according to claim 1, wherein the first and second plungers are aligned along a common axis.
3. (Cancelled) A pump according to claim 1, wherein the first and second plungers are driven by means of a single cam ring.
4. (Withdrawn) A pump according to claim 1, wherein the first and second plungers are in a parallel-spaced relationship within their respective plunger bores, their respective plunger bores are in communication with one another by way of a connecting passage.
5. (Previously presented) A pump according to claim 1, wherein the first and second plungers are adapted to only partially cover the inlet and outlet ports respectively.
6. (Cancelled) A pump according to claim 1, wherein the pump comprises two or more pairs of plungers, each pair of plungers performing, in use, a pumping cycle and each pair of plungers having a respective inlet and outlet port.
7. (Previously presented) A pump according to claim 1 wherein a pumping cycle phase difference of  $115^{\circ}$  to  $130^{\circ}$  exists between movement of the plungers of each plunger pair.
8. (Previously presented) A pump according to claim 1 wherein a pumping cycle phase difference of  $120^{\circ}$  exists between movement of the plungers of each plunger pair.
9. (Previously presented) A pump according to claim 1 wherein a pumping cycle phase difference of  $130^{\circ}$  exists between movement of the plungers of each plunger pair.
10. (Currently amended) A pump for pumping fluid comprising:  
two pairs of plungers, each pair of plungers performing, in use, a pumping cycle and comprising a first plunger and a second plunger and having a respective inlet and outlet port,

USSN 10/780,428

4

each of the first plunger and the second plunger being reciprocable within a respective plunger bore defined by a housing;

wherein the first plunger and the second plunger of each pair define, together with their respective bores, a pumping volume;

an end of the first plunger of a pair is arranged to cover the inlet port during a pump delivery stage in which fluid is displaced from the pumping volume;

an end of the second plunger of a pair is arranged to cover the outlet port during a pump fill stage in which fuel is drawn into the pumping volume;

wherein the end of the first plunger and the end of the second plunger of a pair are arranged to cover the inlet port and outlet port respectively during a pump transfer stage during which the pumping volume is kept substantially constant;

wherein each said pair of plungers is mounted in opposed in-line formation within said housing.

wherein said pairs of plungers are coupled to a shoe that embraces a respective roller that is in contact with, and is thus driven by a single cam ring configured to rotate about a central axis; and

wherein said plunger bores are arranged in a single plane oriented substantially transverse to said central axis.

11. (Previously presented) A pump according to claim 1, wherein each said inlet port is connected to the outlet of a transfer pump.

12. (Previously presented) A pump according to claim 1, wherein each said outlet port is connected to a common rail fuel delivery system of an internal combustion engine.

13. (New) A pump according to claim 1, further comprising biasing means configured and positioned so as to urge said plungers in a radially outward direction so as to maintain said rollers in substantially constant with said cam ring as said cam ring rotates about said axis of rotation.

USSN 10/780,428

5

14. (New) A pump according to claim 13, said biasing means comprising a resilient member.

15. (New) A pump according to claim 13, said biasing means comprising a volume of fluid positioned within said respective plunger bores, said fluid being pressurized so as to urge said plungers in a radially outward direction relative to said axis of rotation.

16. (New) A pump according to claim 1, wherein said housing remains stationary while said rotates about said axis of rotation so as to impart reciprocating motion to said plungers.

17. (New) A pump according to claim 1, wherein said inlet port and said outlet port are positioned diametrically opposite one another along a respective bore so as to balance forces during said pump fill and delivery stages.

18. (New) A multi-stage fluid pump comprising a plurality of pumps according to claim 1, said plurality of pumps being arranged in series and thus axially spaced along said axis of rotation.